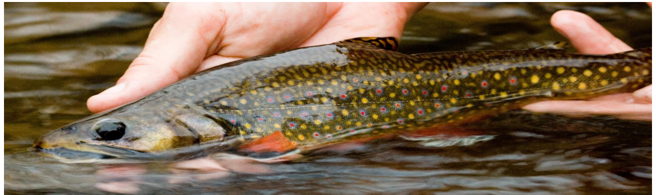
MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

A Conservation Framework for Increasing Resiliency for Maryland's Brook Trout

Maryland
BROOK TROUT

Conservation Framework Pillars

- A framework for success
  - Resiliency-those watersheds that will provide the greatest opportunity for brook trout persistence into the future (a.k.a. "Best of the Best"/Strongholds)
    - Directing habitat and restoration projects to these areas to guarantee success!
  - Protection- Covers all occupied waters. DNR Freshwater Fisheries staff works closely with our partners, providing environmental reviews to ensure stormwater infrastructure, construction projects and habitat projects do not adversely impact coldwater resources
  - Restoration- Identify candidate streams where temperature, water quality, habitat and land use conditions are suitable for reintroduction.



Monitoring and Assessment

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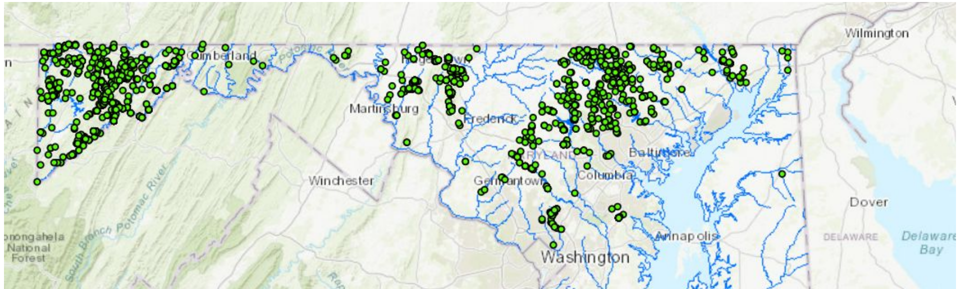
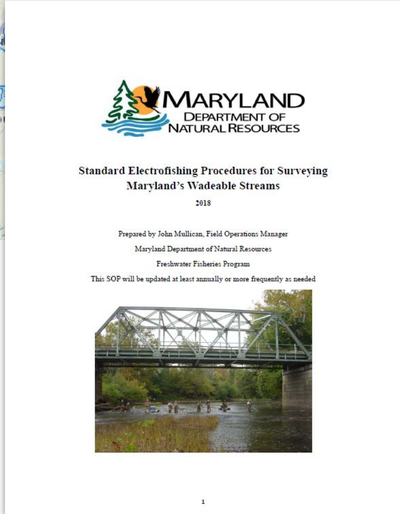
- Science drives management and policy.
- Surveys and water quality monitoring are conducted statewide to maintain current data.
- Utilize scientifically valid, standardized survey and assessment techniques – SOPs.

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Standard Electrofishing Procedures for Surveying Maryland's Wadeable Streams

2018

Prepared by John Mullican, Field Operations Manager

Maryland Department of Natural Resources

Freshwater Fisheries Program

This SOP will be updated at least annually or more frequently as needed

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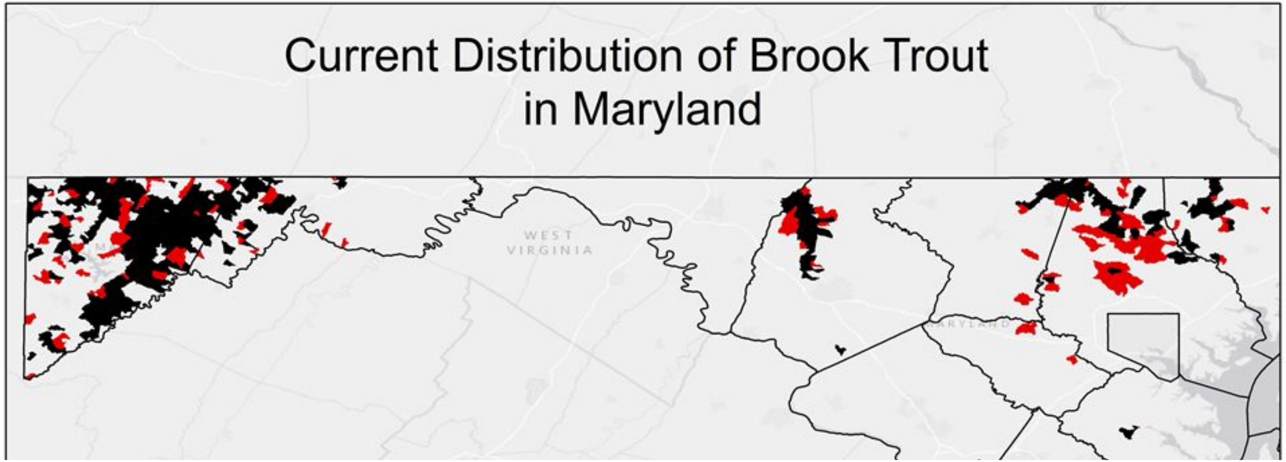
Monitoring and Assessment

Statewide brook trout monitoring.

- Surveys conducted routinely on critical resources.
- Recent five year survey (2014-2018) of almost all Maryland brook trout populations discovered a 27% decline in occupancy statewide.
- Monitoring led to the development of a Brook Trout Conservation Plan.



Resiliency

- Resiliency
  - Following 5 year survey, began assessing all patches to determine our most stable populations using five criteria: Allopatric, Public land ownership, abundance, Diverse spawning stock (N_e), and private conservation easements.
  - Patches that met at least 4 criteria are considered **resilient** and emphasized as priority habitat restoration areas (green below)
  - Subsequent sampling based on filling data gaps

							Criteria 1 - Allopatry	Criteria 2 - Adult Density			Criteria 3 - Genetics		Criteria 4 - Public Land	Criteria 5 - Private Land
Name	Latituc	Longitu	Regi	Criteria Met	Lev	Data Gaps	Allopatr	Ave Adult per KI	Site Coun	Quart	# Ne Sampl	Maximum Ne	Public Lai	Private Lai
Upper Gunpowder River	39.6963	-76.82391	Central	5	1	None	Allopatric	761.8	34	1	2	59.8	Yes	Yes
Middle Fork of Crabtree Creek	39.52833	-79.19707	West I	4	1	None	Allopatric	2071.1	62	1	1	112.5	Yes	No
Upper Savage River	39.62377	-79.06622	West I	4	1	None	Sympatric	1497.8	199	1	1	595.7	Yes	Yes
Fishing Creek	39.55442	-77.47412	West II	4	1	None	Sympatric	1343.4	94	1	2	218.7	Yes	Yes
Big Run	39.57041	-79.17415	West I	4	1	None	Allopatric	1333.3	89	1	1	53.8	Yes	No
Owens Creek	39.65817	-77.48885	West II	4	1	None	Sympatric	1069.4	39	1	1	54.4	Yes	Yes
Little Antietam Creek	39.66845	-77.51725	West II	4	1	None	Allopatric	753.8	22	1	1	11.6	Yes	Yes
UT Prettyboy Reservoir	39.67531	-76.78627	Central	4	1	Genetics	Allopatric	574.3	9	1	No Data	n/a	Yes	Yes
Braddock Run	39.65133	-78.83447	West I	4	1	Genetics	Allopatric	432	14	1	No Data	n/a	Yes	Yes
Bear Creek	39.64361	-79.30596	West I	4	1	None	Sympatric	399	38	1	1	234.6	Yes	Yes
Crabtree Creek	39.46996	-79.21824	West I	3	2	Genetics	Allopatric	1082.2	51	1	No Data	n/a	Yes	No
Lostland Run	39.39204	-79.26838	West I	3	2	None	Allopatric	715.5	16	1	1	32.5	Yes	No
High Run	39.61096	-77.43773	West II	3	2	Genetics	Allopatric	637.8	26	1	No Data	n/a	Yes	No
Little Hunting Creek	39.58507	-77.46988	West II	3	2	Genetics	Sympatric	632.9	49	1	No Data	n/a	Yes	Yes
South Branch of the Casselman River	39.62669	-79.17264	West I	3	2	Genetics	Allopatric	577.8	22	1	No Data	n/a	Yes	No
Piney Creek	39.58073	-76.68526	Central	3	2	Genetics	Sympatric	523.8	7	1	No Data	n/a	Yes	Yes
UT Edgemont Reservoir	39.64686	-77.53435	West II	3	2	Genetics	Allopatric	479.6	18	1	No Data	n/a	Yes	No
Dry Run	39.53355	-79.15955	West I	3	2	Genetics	Allopatric	412.3	6	1	No Data	n/a	Yes	No
Staub Run	39.62768	-78.97299	West I	3	2	Genetics	Allopatric	403.2	3	1	No Data	n/a	Yes	No
Koontz Run	39.59535	-79.00026	West I	3	2	Genetics	Allopatric	400	4	1	No Data	n/a	Yes	No
UT Hunting Creek	39.63194	-77.4896	West II	3	2	None	Sympatric	397.5	29	1	1	30.9	Yes	Yes
Mill Run	39.5427	-78.90661	West I	3	2	Genetics	Allopatric	394.3	20	1	No Data	n/a	Yes	No
Lower Savage River	39.49646	-79.09935	West I	3	2	Genetics	Sympatric	384.8	54	1	No Data	n/a	Yes	Yes

Genetics

Effective population size (Ne): Number of individuals contributing unique genetic information to a population.

- Higher means higher genetic diversity.
- Important for determining genetic health and population resilience.
- Can be used to identify and address connectivity issues.
- Improving Ne can improve population resilience.

Protection

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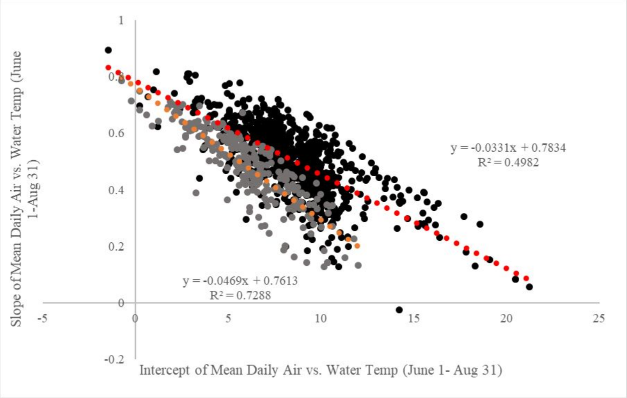
- Protection
  - Ongoing review process for mine and water withdrawal permitting, habitat projects, and infrastructure projects
  - Established new process for thermal reviews with new and existing pond permits in coldwater watersheds with MDE
  - Actively collecting temperature and biological data for Use Class III protection
  - Also working with MDE on thermal TMDL guidance document
    - Local jurisdictions will be required to meet Use Class III guidelines for Coldwater streams, <10 % exceedance of 20° C June 1 – August 30.
  - Brook Trout Management is largely focused on habitat restoration, regulations are conservative, minimizing angling impacts

Reintroduction Assessments

Chesapeake Bay Agreement requires states to increase allopatric brook trout habitat occupation by 8%.

- 8 km have been occupied in Winebrenner Run.
- Data is being collected for habitat suitability, temperature, water quality, and benthic community.
  - Currently 6 candidate streams.
  - Data will be used to determine the highest probability of success. Reintroductions will occur in 2022



Reintroduction Assessments